ZOE

VOL. 5 JUNE, 1900. NO 1

EDITOR, - - KATHARINE BRANDEGEE.

CONTENTS:

Notes on Cacteæ—II: KATHARINE BRANDEGEE 1

Southern California Forms of Phacelia Circinata Jacq.: S. B. PARISH . 9

Notes on Cupressus Macnabiana: ALICE EASTWOOD 11

Cleistogamous Flowers in Scrophulariaceæ: T. S. BRANDEGEE 13

Recent Literature 14

Notes and News 17

ZOE PUBLISHING COMPANY,

P. O. BOX, 684,

SAN DIEGO, CALIFORNIA.

ZOE

A MONTHLY JOURNAL OF BOTANY.

Subscription for United States, Canada and Mexico, $2.00 per year in advance; single numbers, 20 cents.

Other countries in Postal Union, $2.25 per year.

Vol. i, ii, iii, iv, about 400 pages each, with 33 plates, numerous new species, and many important papers indispensable to the student of West American botany, $2.00 each.

Vol. I. will not be sold sold separately, but a few of the numbers can be had singly.

ZOE PUBLISHING COMPANY,

Box 634, San Diego, California.

ZOE

VOL. V. JUNE, 1900. No. 1

NOTES ON CACTEÆ—II.*

KATHARINE BRANDEGEE.

Students of other orders than the so called "succulents", especially Cacti, have not usually a clear idea of the confusion existing in their nomenclature. It would be possible, perhaps, if all the species of Astragalus or Senecio were described from specimens without flowers or fruit, and the types preserved, to identify all or nearly all of them with living forms, though the labor required would be immense. If, however, these imperfect types were thrown away and botanists required to identify plants with only such descriptions, the identification could but be a series of guesses. In this predicament are students of Cactaceæ, and it seems to me that the time has fully come to set science free from such a great and unavailing waste of time.

Cacti, as is well known, are in trade to a considerable extent. Large collections are made in their native places and shipped to dealers, mostly in Europe, who find numbers of plants that answer to none of the spine descriptions in their manuals. They must have names, being unsalable without, and the honest dealer has recourse to a specialist, and waits with what patience he may, while the botanist racks his head over a mass of descriptions which do not describe and struggles to find by a process of exclusion whether the plants have possibly been described by some one who threw away the type after inditing a diagnosis that, but for the generic name, might stand for a sea urchin. In the meantime the unscrupulous dealer prints his list bespangled with "new" species to which he attaches his name, disseminates them to the four quarters, mixing them from time to time

* The first number of this series appeared in Erythea, vol. iii-123.

as the exigencies of trade demand; the next monographer pours all these names into the turgid synonymy, and so the process continues.

To such an extent has the loose and lawless naming gone that besides the immense synonymy (*Mamillaria centricirrha* alone is credited fifty names), there are in the single genus Mamillaria, according to Dr. Schumann, one hundred and forty "uncertain species." In reality there are three times as many, because the synonymy is itself largely uncertain.

The way out of this tangle is difficult but not impossible.

1. All pure nomina nuda should be at once cast out of the lists.

2. All names credited to Catalogues or "Hort" should be credited instead to the first one who describes them intelligently and preserves the type in herbarium. For so great is the external resemblance of species of Cacti that very rarely can one be certain that the plant described is of the same species as the original one of "Cat." or "Hort." Science has nothing to do with catalogue names of plants offered for sale, though the catalogues should and in most cases would be glad to have much to do with science.

3. Species should not be recognized, even in synonymy, without an authentic type. It is astonishing what an amount of information the specialist can extract from very unpromising material, and the man who undervalues types only furnishes proof of his conviction that no one will ever know more or see better than himself.

Cacti are nearly always described from living specimens, and if there be but a single plant in the collection, the owner is usually unwilling to sacrifice it to the preservation of a type, yet a living type may at any time be confused by a careless gardener, and if it dies from disease or age, is so altered as to be of comparatively little value. It is possible, however, to preserve a fair authentic type without destroying the plant. A good photograph, two characteristic, connected areolæ, three or four bunches of spines taken from different parts of the plant, a good flower, a fruit with seed can be taken with little injury from almost any plant, and

such material glued upon a sheet of paper, attested by the author and deposited in an accessible herbarium, would be a vast improvement on most cactus types in existence.

CEREUS EMORYI Engelm. often has tuberous roots of a size approaching those of *C. Greggii* Engelm. I have tried them cooked but found them not particularly palatable.

C. STRIATUS Brandg. Dr. Weber has kindly sent me a fragment of the type of his *C. Diguetii* for comparison. It is identical with *C. striatus*, and much more related to *C. Greggii* than to *C. tuberosus* Pos. The local name of *C. striatus* is "Jaramataca." It forms weak branching stems, 6–12 dm. high, all the lower portion of hard wood, and quite unlike a cactus stem. The tubers are not closely contiguous to the stems, and if separated never sprout, although they live for years and become green if exposed to the light.

C. Orcuttii. Stems erect, branching, bright green, reaching a height of 3 m. and a diameter of 15 cm. with hard woody center; ribs 14–18, about 1 cm. high; areolæ round, about 6 mm. in diameter and about half that distance apart, densely covered with short, light gray wool; spines all slender, spreading, yellowish brown, irregularly 3-seriate; radials 12–20, about 12 mm. long, deficient above; intermediates about 10, ⅓ to more than twice longer, less spreading, one of the upper spines of this row usually stouter and darker, porrect, often reaching a length of 7 cm.; centrals about 5, porrect-spreading a little longer than the intermediates; flowers greenish brown, darker outside, diurnal, about 4 cm. entire length; petals short-apiculate; ovary densely covered with short scales, almost completely concealed by thick, rounded tufts of yellowish wool, in which are imbedded dark brown bristles 4–6 mm. long; stamens lining the upper half of the tube; style tips acute; fruit not known.

The plant from which this description is drawn was obtained by Mr. C. R. Orcutt near Rosario, Baja California, in May, 1886. It was brought to him by his guide, who found it off the trail some little distance. The cutting was planted in Mr. Orcutt's garden, and is now about 2 m. in height; has flowered but

formed no fruit. It is much the finest of the large Cerei of Baja California, being densely covered with bright, yellowish brown spines. By its flowers it is obviously related to *C. Pringlei* Wats. The guide told Mr. Orcutt that it bore in its season edible fruit the size of an orange, but it is possible that he confused it with *C. Thurberi*.

C. SCHOTTII Engelm. var. **australis.** Stems more slender and upright than the northern forms: ribs in the fertile ends, often as many as ten; areolæ smaller and more distant, and the long spines commonly fewer and stouter; abortive spine or gland (?) below the acute base of areola more conspicuous.

Mr. T. S. Brandegee has observed that the southern form of *Pringlei* is more slender than the northern one, and I have noticed the same thing in *C. Alamosensis* Coult. and apparently in *C. Thurberi* Engelm.

I cannot understand how Dr. Schumann is able to refer so unhesitatingly to this species *C. Palmeri* Engelm. in Coult. Contr. Nat. Mus. iii. 401. Engelmann described *C. Schottii*, which, so far I know, never has less than 5 ribs at maturity, always gray spines, and an entirely unarmed fruit, and it is inconceivable that he himself should describe the same species as having "3–4 ribs, greenish-brown spines, and fruit armed with bunches of 5–8 short, stout spines."

The figure of the fertile areolæ of *C. Schottii*, Monog. Cact., 173, appears to be upside down.

C. Schottii, *C. pecten-aboriginum* and, judging by Engelmann's figure of the "young spines", *C. giganteus* belong to the genus Pilocereus as limited by Dr. Schumann. The flowering areolæ of *C. Pringlei* are yet unknown to me. In *C. pecten-aboriginum*, now flowering in our garden, the fertile areolæ show a porrect bunch of spines, not at all spreading and so numerous that I have not attempted to count them. The woolly groove connecting the areolæ in *C. Pringlei*, *C. pecten-aboriginum*, &c., is a continuation of its lower border, as may be seen in the occasional imperfect connections.

C. GEOMETRIZANS Mart. var. **Cochal.** *C. Cochal* Orc. Dr. Schumann reduces this species, but taking Pringle's No. 3743

from San Luis Potosi as fairly typical *C. geometrizans*, the variety differs in the usually greater number of ribs, longer radial spines, more approximate areolæ, smaller, red fruit and seeds smaller at base, with much smaller and not so entirely basal hilum.

ECHINOCACTUS MICROMERIS Weber, Bois Dict. 804, *Mamillaria micromeris* Engelm. *Epithelantha micromeris* Web. l. c. I agree with Dr. Weber that this plant, which bears its flowers near the tips of the tubercles, is an Echinocactus, as the genus is now received. Dr. Schumann appears to dissent from this view principally on account of the "evident relationship" of the plant with *M. lasiacantha*—to which it seems to me to be in no manner related. Dr. Engelmann, indeed, placed them in juxtaposition, but he seems never to have mastered the structure of *E. micromeris*, for he remarked upon its "axillary" flowers and fruits. The seeds would indicate a very different relationship. They are of peculiar form and, though of smaller size, much resemble those of *Echinocactus* (*Astrophytum*) *myriostigma*.

It is a singular fact that the first species mentioned under each of Engelmann's Mamillarian subgenera should be an Echinocactus: *E. micromeris* under Eumamillaria, and *E. papyracantha* under Coryphantha.

ECHINOCACTUS CAPRICORNIS Dietr. A plant in our garden, having its apex dried and hardened by some injury is flowering from all the grooves. The flowers are not single, as from areolæ, but in clusters, 1–2 cm. distant from the top of the groove.

ECHINOCACTUS VIRIDESCENS Nutt. Mr. C. A. Purpus brought this winter a ripe fruit of this species, in which a large number of the seeds had germinated and grown to the length of 4–6 millimetres. I have observed the same thing several times in the green-fruited Mamillarias.

E. ERECTOCENTRUS Coult. In Dr. Schumann's monograph this species is given as a synonym of *E. Beguinii* Web. in Reb. Cat., which is described as having its ribs completely separated into tubercles, while Dr. Coulter says that the ribs of his plant are tuberculate interrupted. To this species probably belongs *E.*

Krausei Hildm. (name only) described by Karl Hirscht in M. f. K. vii. 107. Both *E. Krausei* and the type of *E. erectocentrus* came from the vicinity of Benson, Arizona. *E. Krausei* of Schumann's monograph may not belong to the same species. Dr. Weber's plant from Coahuila, included by Dr. Coulter in his type, is unknown to me. Dr. Weber, in Bois Dict. 466, 1893, under *E. horripilus* Lem., says: "L' *E. h. Erectocentrus* Web. (Syn.: *E. Beguinii* Web. *Mamillaria Beguinii* Hort.) est une forme à tige toujours simple et aiguillons plus nombreux, érigés." I think all must agree that this is not a valid description, and Dr. Coulter's has priority over all the others that are not nomina nuda.

A very gorgeously colored chromo-lithograph of this species (and *Cereus pectinatus rigidissimus*), under the name of *Mamillaria Childsi*, was issued some time ago as an advertisement by A. Blanc of Philadelphia, and was reissued in F. A. Walton's Cactus Journal for June, 1899. Names like this should not be interjected into botanical nomenclature, and the only reason for mentioning it here is that Dr. Schumann comments upon it in M. f. K. ix. 117, as a species unknown to him.

MAMILLARIA SCHEERII Muhlpf. Professor Schumann includes this species in his division "No red or yellow glands in axil or groove", and gives as synonyms, *M. Salm-Dyckiana*, *M. robustispina* and *Echinocactus Poselgerianus*.

In describing var. *valida* of *M. Scheerii*, Dr. Engelmann expressly states that there are from 1–5 red glands in the groove, so also runs the original description of *M. Scheerii*, and so it is found in my specimens. *M. robustispina*, to which and not to *M. macromeris*, as Dr. Schumann refers it, certainly belongs *M. Brownii* Tuomey, collected in the same locality, shows only occasionally a single gland just back of the spines, and the central spine is often hooked. All these mamillarias have yellow flowers, yet Dr. Schumann describes the flower as "bright rose-red (according to Weber, also yellow)". The flower of his description must therefore come from *Echinocactus Poselgerianus*. In the original description of this latter, the flower was lacking, but the plant was compared to *E. hexædrophorus* Lem.

M. RECURVATA Engelm. *M. recurvispina* Engelm, *M. Nogalensis* Runge Cat. abounds in collections in two forms, one with bright yellow, the other with much paler or whitish spines. A character which appears not to have been noticed is the presence, just back of the spines, in the groove of a large oval gland. By the kindness of Prof. Trelease I have been able to verify this upon the type of *M. recurvispina*. In cultivation this species appears to flower with difficulty, but the few cases noticed show the flower and fruit to be remote from the centre.

MAMILLARIA PRINGLEI (Coult.) Cont. Nat. Herb. iii. 109 (under Cactus). The type of this species is not to be found in the Gray Herbarium at present; it may be misplaced. No plant of the kind is in our set of Pringle's, but at my request Mr. Pringle very kindly sent me for examination the cacti of his private herbarium. I find among them a plant labelled "Mamillaria, Tultenango Cañon, 17 Oct. 1890, No. 3679," which agrees with the description—though I should call the flower purple, not red. It seems to me scarcely to differ from *M. Carretii* Schumann. Both plants are described as having naked axils, but my specimen of the latter, which came from McDowell, Mexico, and so probably from the original collection, is more or less setose.

M. armillata*. Stems somewhat attenuate, reaching 3 dm. in height, 4–5 cm. in diameter, usually in clusters of 3–12, from the base, often branching above; tubercles somewhat leathery in texture; conical, somewhat angled; axils setose and sparsely woolly; radial spines 9–15, 7–12 mm. long, the inner half whitish or grayish; centrals 1–4, 10–20 mm. long, the lower one hooked and longer, all, and the outer part of the radials dark brown, yellowish or gray; flowers 1–2 cm. long, scarcely spreading, flesh color; fruit red, clavate, 1½–3 cm. long; seeds coriaceous, dull black, about 1 mm. long, obliquely obovate, constricted above the more slender basal portion; surface covered with minute, not closely contiguous pits, the intervening spaces minutely wrinkled; hilum basal, narrow. San José del Cabo, Baja

* Plates of the new species of Cacti will appear at the end of the volume.

California. The name is in allusion to the dark bands which encircle the plant, giving it much the appearance of a raccoon's tail.

M. venusta. Simple becoming cæspitose in clusters of, in extreme cases, as many as 40; heads 2–4, very rarely, in center of large clusters, 6 cm. high, a little less in diameter; tubercles thick and short, concave at the end, greenish, purplish to nearly white, glaucous; axils only slightly woolly, soon naked; radial spines, 9–15, stout, 6–12 mm. long; centrals typically solitary, 10–15 mm., sometimes 2 or 3, in a single specimen 4, porrect-spreading, the three upper very short; flowers about 4 cm. in diameter, rose-color, widely spreading, tube very short; petals lanceolate acute, recurved–spreading; style-branches 5, apparently rosy brown; fruit 1½–2 cm. long, scarlet, linear, circumscissile some distance above the base, nearly dry; seeds oblong-obovate, rather less than 1 mm. long, constricted above the basal portion, which is half as long and nearly as wide as the upper; surface dull, minutely pitted, the pits much obscured by delicate intervening striæ; hilum basal, large and triangular.

Collected by Mr. T. S. Brandegee in the vicinity of San José del Cabo, Baja California, in Sept., 1890. (No. 240, *M. Goodrichii*, of "Flora of the Cape Region"); again Sept. 1893, and for the third time last year in numerous living specimens. It has been known for some time that it was undescribed, but in this group complete material is necessary. The spines are from pure white, barely tipped with brown, to dark brown, whitish only near the base. The flowers, which appear in September, hide the whole plant, and it is of such low growth as to look like a beautiful cluster of flowers springing from the sand. The fruit appearing in winter is nearly dry and falls very readily when ripe, leaving most of the seeds in the axillary cup. It is the only circumscissile mamillaria known to me.

M. Schumanii Hildm. M. f. K. i., 125, abb. bei p. 102, bears some resemblance to *M. venusta*, but is a much larger, relatively more slender plant, and presumably came from the mainland. Dr. Schumann remarks in Monog. Cact. 545, that he has

not seen it—which means, I suppose, that the type was not preserved.

M. fragilis, S.-D. Prince Salm-Dyck, having noted that this familiar little plant did not agree with the description of *M. gracilis Pfr.*, suggested *M. fragilis* as a highly appropriate name for a plant which sheds its multitudinous offsets on the slightest provocation. The original description of *M. gracilis* reads: "Cylindrical, slender, proliferous; axils naked; tubercles short, obtusely conical, areolæ nearly naked; radial spines 16, bristle-like, white; central 2 more rigid." The type presumably was not preserved. Certainly no one will argue that this description could apply to *M. gracilis*, and if investigation shows that no type is in existence the unmistakable name proposed by Prince Salm-Dyck should be adopted.

M. BRANDEGEI Coult. *M. Gabbii* Engelm. in Coult. Prof. Schumann includes these in the synonomy of *M. Heyderi* Mühlpf., but they seem to me, from the description, nearer *M. simplex* Haw. A large amount of material brought by Mr. C. A. Purpus from the vicinity of Calmalli, Baja California, shows the species to be quite variable in form, color and spines, while agreeing in flower and fruit. The plants are usually globose-flattened or short cylindrical, commonly single, often double sometimes dichtomous, and occasionally in clusters of 8 or more. In color the spines vary from nearly white to dark brown; the radials 9–16, centrals 1–4, most commonly 2, all the number variations often found on the same plant. Flowers greenish-yellow, about 15 mm. long, tubular, hardly expanded above. Fruit white, more or less tinged with lilac, commonly bearing 1–5 fringed scales, with sometimes a tuft of weak spines in the axils.

SOUTHERN CALIFORNIA FORMS OF PHACELIA CIRCINATA JACQ.

S. B. PARISH.

It would readily be inferred from the extensive geographical distribution of *Phacelia circinata* that it would present marked

local variations; and such is, in fact, the case. Some of these are so distinct in appearance, as to be taken as even specifically different. But on examination it is found that the very nature of these differences, based as they are on more important identities, forbid such a view, the diverse aspect exhibited by extreme forms being due to the degree of development of common characters.

All the forms are alike in the aggregation of most of the leaves in basal clusters; in a pubescence of two kinds, one long and strigose, the other short, close and fine; and in floral characters. The filaments and styles are much exserted, the former sparsely arachnoid on the exserted part, and the latter hispid on the included portion; the appendages of the corolla are joined to the base of the filaments so as to form pockets behind them, while their united edges form inverted pockets between the filaments; the ovary is densely hirsute, and becomes a small (line high) acute capsule with alveolate seeds.

In different forms the stems may vary from a height of one or two inches to as many feet, the strigose hairs may quite cover the finer pubescence, or both may be scanty, and the cymes and cymules may be condensed, or elongated and diffuse. The typical leaf form is pinnate, with a large ovate or lanceolate terminal lobe, and a few small lateral ones at base, but these differ in number and shape, or may be suppressed.

The more pronounced of these forms are perhaps worthy of varietal names, but these should be bestowed only after the study of very ample material, and the examination of types of the proposed species that have passed into synonymy.

The purpose of the present paper is merely to note a few distinct forms growing in various parts of Southern California, which appear to be fixed in type and exclusively present in the localities where they occur. All our plants are perennial but farther north there are annual or at most biennial forms, which differ in no other respect from the perennial ones.

(*a*) Stems slender and very unequal, 2–12 inches high, sparsely leafy, sparsely hispid, the finer pubescence very short; leaves lanceolate, 1–2 inches long, all entire, 8-nerved; cymules distant and short.

Bear Valley, at 6,500 ft. alt., in the San Bernardino Mts. 2,-957 *Parish.*

(*b.*) Stems foot high, equal; very sparsely hirsute or pubescent; leaves with a pair of large triangular teeth at base, 4-nerved; cyme diffuse.

Green Valley, 6,000 ft. alt. in the San Bernardino Mts., *H. M. Hall.*

(*c*) Stems stout, 6–18 inches high, but nearly equal in the same plant, canescently hispid, pubescence very short; leaves 1–2 inches long, on petioles of the same length, lateral lobes 1–2 pairs, short, acute; cymes of dense, elongated geminate cymules.

Along the base of the mountains near San Bernardino, at 1,-200–1,500 ft. alt., 4160 *Parish.* Type of *P. virgata* var. (?) *Bernardina*, Greene, Eryth. 4.55.

(*d*) Stems slender, very unequal, 2–18 inches high in the same plant, leafy and floriferous from near the base; sparsely hispid, fine pubescence very close and short; leaves with several scattered and very unequal acute basal lobes; cymules distant and short.

Stonewall mine, 4,600 ft. alt. in the Cuyamaca Mts. 4423 *Parish.*

NOTES ON CUPRESSUS MACNABIANA.

ALICE EASTWOOD.

This Cypress is, according to Professor C. S. Sargent (Syl. N. Am. X. 109), one of the rarest trees in California, known only from a few dry slopes on the hills south and west of Clear Lake, in Lake County. The specimens from which the species was described were, however, collected at the southern base of Mt. Shasta, in 1854. Since then, it has not been found around Mt. Shasta. Dr. C. Hart Merriam (Biol. Surv. of Mt. Shasta, N. Am. Fauna, 16, 138) has suggested that the term 'Shasta' was probably used in a rather loose sense, as covering adjacent mountains not then named.

Recent collections in Mendocino, Lake, and Napa Counties give new and more definite information concerning the distribution

and habitat of this species, showing that it is much more widely distributed than has been supposed.

In the first place, this Cypress is more partial to the banks of streams than to dry slopes and only in moist localities do the trees attain any size. Generally it is associated with *C. Goveniana:* but among all the trees that have come under my observation the two species are distinct and without the slightest trace of hybridization. Carl Purdy who has found these two species together on Red Mountain in Mendocino County tells me that, there, they seem to intermingle.

On the stage road between Hopland and Highland Springs, on the eastern slope of the dividing ridge, not very far from the summit, I saw *C. Macnabiana* for the first time. It startled me by its pale and strange appearance. This first tree was one of the largest seen and grew along the creek bordering the road. From there to within three miles of Highland Springs these cypresses occurred sparingly along the creek, associated generally with *C. Goveniana.* At one place, quite a dense grove of small trees appeared to be climbing up the hillside. These were from five to fifteen feet high, pyramidal in outline, with the lowest branches sweeping the ground. The large trees lose this symmetry, become loosely branched and rise to a height of from thirty to forty feet, with a diameter near the base of the trunk, of between one and two feet.

A week later, on the road from the toll-house on Mt. St. Helena to Middleton, in Napa County, not far from the summit of the ridge, I again found a patch of *C. Goveniana* on the hillside, near the road. I wondered whether the other species was to be found along the creek that could be seen far below at the base of the hill, and, upon investigation, discovered a few scattered trees there, but genuine representatives of the species. Several years ago Mr. John Mc. Lean had brought specimens of this cypress from the same range of hills, which he had collected on the road from Calistoga to the Etna mines and had presented to the Herbarium of the California Academy of Sciences.

In this collection, also is a specimen collected by Dr. C. C. Parry at Chico, Butte County.

No authors who have written of this Cypress have mentioned the delightful fragrance of the fresh foliage. Probably they have know only dried specimens from which the charateristic odor disappears. It is somewhat like sandalwood, but sweeter and not so strong and with a flavor of pineapple. However, even without this, there ought to be no difficulty in distinguishing *C. Macnabiana* from its associate *C. Goveniana*. Its later period of blooming, its delicate foliage, sprinkled all over with tiny white glands, and its peculiar cones with their horn-like bosses mark it as distinct from this as well as from all other species.

CLEISTOGAMOUS FLOWERS IN SCROPHULARIACEÆ.

T. S. BRANDEGEE.

LINARIA CANADENSIS Dum. as it grows about San Diego has a multitude of cleistogamous flowers on the lower part of the main and the whole length of the many side branches. These flowers are from 1½–3 mm. long (not equaling the calyx-lobes), not spurred, usually white, but bluish in transitional forms. The fully developed flowers are as large as I have seen in the specise.

ANTIRRHINUM COOPERI Gray. The early flowers of this plant are often, if not always, cleistogamous, and *A. filipes* Gray was evidently founded on such a condition.

A. WATSONI V. & R. has early cleistogamous flowers.

A. SUBSESSILE Gray. This is the common species about San Diego and in consequence has been most observed. While cleistogamy is the rule in the young plant, it does not always occur. Transition forms are found in the later flowers, which even though still cleistogamous often show color: the earlier flowers being white and scarcely exceeding the calyx-lobes.

RECENT LITERATURE.

Gesamtbeschreibung der Kakteen (Monographia Cactacearum) von Dr. Carl Schumann, *mit einer kurzen Anweisung zur Pflege der Kakteen, von* Karl Hirscht, *pps. 1-832, figs. 1-117. Neudamm, 1899.*

Since the appearance of the second edition of Förster's Handbook in 1886, no attempt until now has been made to bring together all the described species of cacti. Förster admitted over nine hundred as valid species; Dr. Schumann enumerates less than seven hundred, including one hundred and eighty new or recent ones. He has, therefore, reduced by about one-half the species of the previous monograph. The work, though more scientific in form than Förster's, appears to be intended primarily for the use of gardeners and amateur cultivators of Cacti. Indeed, the species are still too little known to admit of settled classification.

The descriptions of species are unnecessarily long, the same phrases being repeated page after page, when by a judicious use of sections the book might be greatly reduced in size. A more serious matter is the alteration of the original diagnoses, in many cases quite obscured by broadening to include descriptions of other forms, which may or may not be related, or as in a number of cases the original character is set aside and the description entirely re-written from living plants, the identification of which is not entirely free from doubt. In consequence the original sources must be consulted, and the botanical interest of the work consists chiefly in the new species and the grouping.

The sequence of the genera in Förster is, perhaps, to be preferred. The separation of the Rhipsalidæ from Cereus and Phyllanthus by the interposition of Echinocactus, Mamillaria, etc., is quite unnatural. The species of Epiphyllum are distributed to Cereus (*E. obtusangulum* Lindb.) and to Phyllocactus (*E. Russellianum* Hook. and *E. Gartneri* Sch.) leaving *E. truncatum* Haw. alone to represent the genus which is kept up solely on such a trivial character as the obliquity of the flower. It would seem much better to group together the species by their common

character of flowering from the depressed summit, and place them as a section in Phyllacanthus.

In the Opuntiæ a more natural sequence would seem to be Peireskia, Maihuenia, Pereskopuntia Pterocactus, Cylindropuntia, Platopuntia, Nopalea. Mahuenia attributed to Phillippi but no reference given, and no species credited to him, appears to me better as a section of Pereskia. Pereskopuntia might, perhaps, include Pterocactus, the ovary being buried in the fruit-bearing branch, in both; at least it is so in the *Pereskopuntias Porteri* and *Brandegei.*

The proposed division of Cereus by reinstating with altered boundaries the old genera Cephalocereus and Pilocereus cannot well be carried out. The plants so brought together are quite heterogeneous.

Echinocactus as at present received is a somewhat confused assemblage, some of its members too closely connected with other genera. By their fruits and seeds, when they are better known, it may be possible to improve the generic boundaries.

The sections of or subgenera are still poorly defined. The lactescent species are often difficult, and in herbarium specimens impossible to discriminate. A considerable number of the species in Dr. Schumann's § *Hydrochylus* undoubtedly have milky juice. Of those which have latex only in the body of the plant discrimination is sufficiently difficult even in life, for the amount seems to vary greatly with the state of growth.

The subgenus Coryphantha is divided into two sections, Aulacothelaæ and Glanduliferæ, by the presence or absence of glands in the axil or groove, only five of the twenty-two species being credited with them, while as a matter of fact they can be demonstrated in most of the other species.

There are occasional errors in citation, quite pardonable considering the number of references. A curious instance of confused reference is found at the foot of page 495, where he finds it very strange that Coulter could not find *M. daimonoceras*, for "it is to be found on the same page with *M. impexicoma*, which he cites, and Prince Salm-Dyck quite correctly, l. c. 131, quoted."

On looking up the reference in Salm-Dyck, it is found to be "Lem, Cact. gen nov. p. 5," whereas it should be Lem. Cact. aliq. nov. 5, an earlier work by the same author.

Quite a number of names have perhaps by accident been omitted from the work. Among them are the following new ones by Prof. Coulter: *Cactus alternatus*, *brunneus*, *capillaris*, *densispinus*, *Eschanzieri*, *maculatus*, *Palmeri*, *Pringlei*, *radians-pectenoides*.

The most objectionable feature of the monograph is the reference of a considerable number of new names to ephemeral trade catalogues, of which in most cases no number or page is cited. For example: "*Mamillaria Trohartii* Hildm. cat.", locality "Mexico", flower and fruit "unknown"; "*Mamillaria gigantea* Hildm. cat."; synonyms—"*M. McDowellii* Hildm. cat. *M. Guanajuatensis* Runge cat." These references are mostly to names only, sometimes with a brief unscientific notice, and are as a rule inaccessible to students, not being offered for sale but issued yearly to the trade as a list from which customers may order plants. Fortunately the English and American catalogues are entirely ignored.

Pittonia, vol. iv., Pt. 22, pp. 105-158. In the first paper Prof. Greene falls upon Prof. Underwood for stating the fact that "Necker's fern genera [Necker calls them species] are not based on types and no earlier references are cited." This is true of all his other "species", and while it is undeniably true that most of them may be picked out by a process of exclusion, it is also true that there is a growing number of botanists who wish to have some portion of their time for investigations which shall add to the sum of knowledge rather than to waste the whole of it in profitless researches into nearly forgotten works, from which about the only good to be derived is a possible change of name. The present system of change from the plain and well-known to the obscure and vague, is fast driving botanists towards an international commission and deposit of all new types in national museums. The remainder of the number is taken up with "decades" and "fascicles" of new species, forerunners, perhaps, of centuries and myriads.

Erythea VII, No. 12, pt. 1. The announcement is made that this journal will cease with the next number containing title-page, index, etc. Its discontinuance is much to be regretted but it is understood that its superintendence made too great a draft on the time of the editor, whose duties as Assistant Professor of Botany in the University of California leave little space for outside work.

In the Botanical Gazette for April, 1900, Prof. B. L. Robinson in noticing The Synopsis of Mexican and Central American Umbelliferæ says: "The many specific names which the authors have been obliged to coin, are mostly the simple and familiar descriptive terms of the *glauca*, *serrata* and *rigida* type, with no such linguistic jumbles as *pseudoparviflora*, *heterappendiculata*, *Saxifragopsis*, *parvicarpum*, etc., which have of late so frequently marred the publication from other American botanical establishments, although rarely found in the writings of our more classical transatlantic colleagues. Another point which merits special mention is the scrupulous care with which the authors have avoided the publication of manuscript or herbarium names in their synonymy—a useless practice which, notwithstanding the emphatic protest of Mr. B. Daydon Jackson and others, is still too prevalent." We commend these remarks to some of our western botanists who are apparently anxious to condense a page of description into a specific name.

The Fern Bulletin for 1900 contains a characteristic photograph and and an appreciative notice by Thomas Meehan of John H. Redfield. He was the founder of the botanical section of the Philadelphia Academy of Sciences, and curator of the herbarium. His books and collections were sold for its benefit, the latter going to the Missouri Botanic Garden.

Dr. C. A. Purpus has gone for a collecting trip to the boundary region between Utah and Colorado. His botanical collections made in that region last year were principally from the high mountains.

JOHN R. BARROWS

announces to the botanical world and to the general public the fact that as a

DEALER IN RARE CACTI

he offers Mammilaria venusta, M. armillata and other new species as well as the commoner and better known forms,

AND

Attractive prices will be quoted. He will furnish bright, healthy plants and will endeavor, generally, to make of every purchaser a friend and well-wisher. Correspondence is invited upon this subject. He offers also

BOTANICAL SPECIMENS.

Believing that the time has come, when large sets of plants from regions already fairly well known are no longer desirable in the larger herbaria he offers for sale as desiderata a large number of rare plants collected by Dr. C. A. Purpus, A. W. Anthony and others.

Plants will be in good condition, correctly named, and special attention given to fruits.

CATALOGUE ON APPLICATION.

SAN DIEGO, CALIFORNIA, U. S. A.

P. O. BOX 296.